

Appl. No. 09/584,363
Reply to Office Action of May 19, 2003

Our File: 38898-0089 TLS

REMARKS

Claims 3 – 7, 9 – 22, 27, and 29 – 32 are currently presented for examination. Claim 20 has been amended to conform with previously amended claim 3 by reciting having an input optical path “through an assigned ingress area” and an output optical path “through an associated egress area”. No new material has been added by the amendment. All other claims are unchanged from the previous response.

The Examiner has rejected claims 3-32, 27, and 29-32 under 35 U.S.C. 103(a) as being unpatentable over Laor *et al.* (U.S. Patent No. 6,446,711 B1) in view of Gloeckner *et al.* (U.S. Patent No. 6,445,841).

Laor *et al.* disclose an optical switch device which includes a first array of reflectors, each reflector associated with a separate optical fiber or input, and a second array of reflectors, each reflector associated with a separate optical fiber output. (ABSTRACT) The reflectors of the matrix or array are positionable to direct an optical signal from any one of the fiber inputs to any one of the fiber outputs. (Id.) The optical signal is directed along an optical pathway between the desired fiber output and its associated reflector that is substantially aligned with an axis extending centrally from the fiber output. (Id.) As well as planar switches containing arrays of reflectors, Laor *et al.* further discloses “Three-Dimensional Space Switches” in which a first matrix of reflectors is used to reflect the optical signals along optical pathways from fiber inputs arranged in a matrix, to a second matrix of reflectors and subsequently to a matrix of fiber outputs. (Column 6, lines 35-67, and Column 7, lines 1-18). Of particular note in Laor *et al.* is the specific teaching that “*The optical pathways between the second array and the fiber outputs are in substantial alignment with axes extending centrally from the corresponding fiber outputs.*” (Column 7, lines 14-18).

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Gloeckner *et al.* disclose various configurations of optomechanical matrix switches for switching optical signals from input fibers to output fibers wherein a array of mirrors each controlled by an actuator may direct a signal from an input fiber to an output fiber. As well, Gloeckner *et al.* discloses particular embodiments in which WDM de-multiplexing and multiplexing components (1731 a-d) components are used externally to the optomechanical matrix switches. (Figures 17 and 18, Column 14, lines 41-44) These WDM components external to the switch serve to de-multiplex beams from WDM input fibers into constituent single-wavelength channels so that the optomechanical switch may deal with them as separate optical signals. Upon completion of a desired switching operation, external WDM multiplexing components multiplex the emerging single-wavelength channels into a multi-wavelength optical signal for input to a WDM output fiber. As is clear to the Examiner, the WDM components are disclosed as an external adjunct to a planar optomechanical switching element so as to render the WDM signal a cluster of independent optical wavelengths before entry and after exit of the switching matrix.

NO MOTIVATION TO COMBINE

The Examiner has stated in his rejection that *"It would have been obvious to one of ordinary skill in the art at the time of invention to apply the Gloeckner control unit and demultiplexer to the Laor apparatus for the benefit of being able to redirect multi-wavelength signals from input ports to output ports"* however has provided no indication of where in either of the cited references there is a suggestion to combine. As is known to the Examiner, *"[T]o establish obviousness based on a combination of the elements disclosed in the prior art, there must be some motivation, suggestion or teaching of the desirability of making the specific combination that was made by the applicant."* In re Kotzab, 217 F.3d 1365, 1370, 55 USPQ2d 1313, 1316 (Fed. Cir. 2000) (citing In re Dance, 160 F.3d 1339, 1343, 48 USPQ2d 1635, 1637 (Fed. Cir. 1998) and In re Gordon, 733 F.2d 900, 902, 221 USPQ1125, 1127 (Fed. Cir. 1984)).

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Laor *et al.* neither discloses nor suggests the switching of multiple wavelengths present upon a single fiber as is inherent to WDM optical signal switching. Gloeckner *et al.* neither discloses nor suggests switching of an optical signal "...away from the plane of said input matrix to an output optical switching element of said output matrix" as in Applicant's claimed invention. Absent some suggestion or motivation to combine that comes from the prior art references, the assembling of these references is improper and the rejection should be withdrawn.

COMBINATION FAILS TO DISCLOSE ELEMENTS OF CLAIMED INVENTION

Notwithstanding the previous argument, Applicant further wishes to submit that even had there been a suggestion or motivation to combine the references, the combination does not suggest Applicant's claimed invention. The WDM de-multiplexing components recited in Gloeckner *et al.* act to separate the incoming WDM signal into separate optical channels. The optomechanical switching matrix switches the separated optical channels in no different manner than in a non-WDM switching case. At the completion of the switching operation, WDM multiplexing components act to multiplex the switched optical channels into an output WDM signal. As may be seen by the Examiner, the WDM components act as an external adjunct, rendering the Gloeckner *et al.* optomechanical switching matrix usable in a WDM system.

By way of contrast Applicant's claimed invention in independent claim 3 recites "...an assigned ingress area..." and "...an associated egress area...". As taught in Applicant's invention, these areas stand in relationship to the input and output switching matrices as discussed at page 9, line 21 to page 10, line 2. The external WDM components described in Gloeckner *et al.* do not provide an "area" of any sort in relation to the switching elements. In point of fact, the Figures 17, 18 and 19 provide for a plurality of separate "channels" entering and exiting the optomechanical switching matrix, for example at reference 1726, 1728, and 1730. As the Examiner can see, neither Laor *et al.* nor Gloeckner *et al.* teach or

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suggest ingress or egress areas.

COMBINATION FAILS TO DISCLOSE RELATIONSHIPS AMONG ELEMENTS OF CLAIMED INVENTION

Further, the Examiner's attention is drawn to the teaching of Laor *et al.* previously noted that the optical pathways between the arrays and their corresponding fibers are in substantial alignment with axes extending centrally from the corresponding fibers. Applicant's claimed invention in independent claim 3 does not provide for an alignment of the arrays and the corresponding fiber inputs and outputs, but instead has "...an optical demultiplexer for separating a wavelength λ_k from an input multichannel signal $S_{in}(k,i)$ received on an input port i of said plurality of input ports, and directing said wavelength λ_k on an assigned ingress area along a predetermined input path..." and an "... an optical multiplexer for directing said wavelength λ_k from said associated egress area along a predetermined output path, and combining said wavelength λ_k into an output multichannel signal $S_{out}(k',i')$, transmitted on an output port i' of said plurality of output ports". It is clear that in Applicant's invention as claimed the optical pathways to the switching elements do not correspond to axes extending centrally from the corresponding fibers, and Laor *et al.* can be fairly said to be teaching away from Applicant's claimed invention.

As neither Laor *et al.* nor Gloeckner *et al.* disclose or suggest, singly or in combination the elements of ingress and egress areas of the present invention, and as one of the references teaches away from the relations of the elements recited in the claims of the present invention, Applicant submits that that the subject matter of the Applicant's claims would not have been obvious to a person skilled in the art or science to which it pertains, and the objection is respectfully traversed.

Likewise, both Independent claim 22 and amended independent claim 20 recite the presence of "...an assigned ingress area..." and "...an associated egress area..." and also would not have been obvious to a person skilled in the art or science to which it pertains,

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and the rejection is respectfully traversed with respect to these claims.

DEPENDENT CLAIMS


With respect to the Examiner's rejection of claims 4-7, 9-19, and 30-32, Applicant notes that these claims all have claim 3 for their base claim. Applicant submits that, as these claims are dependent from claim 3, then they are allowable for at least the same reasons and arguments recited above.

Likewise, with respect to the Examiner's rejection of claim 21, Applicant submits that, as this claim is dependent from amended claim 20, then it is allowable for at least the same reasons and arguments recited above.

With respect to the Examiner's rejection of claims 27 and 29, Applicant notes that these claims depend from claim 22, and Applicant submits that they are allowable for at least the same reasons and arguments recited above.

In view of the foregoing arguments, Applicant submits that the claims are in condition for allowance. Favourable reconsideration and approval of this application is respectfully requested.

Respectfully Submitted,

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